Space Weather Forecast

Issued on Saturday 21 December 2024 at 01:18 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class flares likely (Minor-Moderate Radio Blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with two Moderate class flares, the largest originating from a region in the southeast. There are currently nine sunspots visible on the Earth-facing disc, comprising of eight numbered regions and one unnumbered region. The most significant regions are situated close to each other in the southeast, all appear moderately complex and two regions are moderately sized, although one region is still close to the southeast limb and is therefore hard to analyse. Most remaining regions are small and magnetically simple, although a region approaching the southwest limb is moderately sized. All regions on the disc appear fairly stable, with little or no change over the past 24 hours.

No Earth directed coronal mass ejections (CME's) were observed in available imagery, although a small filament eruption occurred in the northwest quadrant, with an associated long duration Common-class flare peaking at 20/2245 UTC.

Solar Wind / Geomagnetic Activity: Solar winds have been at elevated to slightly elevated levels, with a peak of 552km/s observed at 20/1208 UTC. The magnetic field was predominantly weak, but temporarily peaked at moderate levels at 20/1632 UTC. The important north-south component weakly fluctuated. The phi angle was predominantly negative (towards the Sun). The resulting geomagnetic activity was Quiet to Unsettled, except for an initial Active interval observed between 20/0000-0300 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, although there has been a gradual increase in proton flux from background to slightly elevated levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is forecast with further isolated Moderate class flares likely, mainly from one of the regions in the southeast, but also from new or returning regions which are expected to rotate onto the disc through the period. There is a slight chance of isolated Strong flares throughout.

Solar Wind / Geomagnetic Activity: Solar winds are currently at slightly elevated levels, and are expected to gradually decline to background conditions over the next few days, before a weak

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enhancement from a small coronal hole feature potentially arrives late day 3 into day 4 (23rd and 24th). Currently no Earth-directed CME's feature in the forecast, although imagery is awaited to see if a CME was associated with the small filament eruption on the 20th. Geomagnetic activity is expected to be predominantly Quiet to Unsettled, with a chance of isolated Active intervals.

Energetic Particles / Solar Radiation: There is a chance of S1/Minor solar radiation storms, if the current steady increase in proton flux continues, in addition to a response from any notable solar flares.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	60	60	65	70
Very Active	R3-R5 (X Class)	No	5	5	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	50	50	50	50
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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